Express Mail Label No. EM406007060US

PATENT
Atty. Docket No.QCS-001DV3
(6695/2)

Particulars of prior application:
Serial No.: 09/488,647
Filing Date: January 20, 2000
Examiner: K. Picardat of Art Unit 2822
Status: Pending

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT:	Kamieniecki et al.		
SERIAL NUMBER:	Not yet assigned	GROUP NUMBER:	Not yet assigned
FILING DATE:	August 17, 2001	EXAMINER:	Not yet assigned
TITLE:	REAL-TIME IN-LINE TESTING OF SEMICONDUCTOR WAFERS		

Box CPA
Assistant Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

This preliminary amendment is filed pursuant to the filing of a divisional application claiming priority to U.S. Patent Application Serial Number 09/488,647 filed on January 20, 2000, which claims priority to U.S. Patent Application Serial Number 08/853,171 filed on May 8, 1997, now U.S. Patent Number 6,069,017 which claims priority to U.S. Patent Application Serial Number 08/396,694 filed on March 1, 1995, now U.S. Patent No. 5,661,408.

Kindly enter the following preliminary amendment in the above-identified patent application, prior to examination.

In the Specification

At page 1, before line 1, please insert the heading and following paragraph:

RELATED APPLICATIONS

This application is a divisional application of U.S. Application No. 09/488,647 filed on January 20, 2000, which claims priority to U.S. Application No. 08/853,171 filed on May 8, 1997, now U.S. Patent No. 6,069,017, which is a divisional application of U.S. Application No. 08/396,694, filed March 1, 1995, now U.S. Patent No. 5,661,408.

At page 10, please replace the first paragraph with the following:

In brief overview, and referring to Fig. 1, an embodiment of such an apparatus 10 for the real-time, in-line, electrical characterization of a semiconductor during manufacturing using induced surface photovoltage includes a sensor head assembly 14, supporting electronics 18, and a wafer conveying device 22. In operation, the wafer conveying device 22, such as a conveyor belt, a robotic arm, a wafer chuck or similar device, moves wafers 28, 28' through the manufacturing process and, in one embodiment, beneath the sensor head assembly 14.

At page 10, please replace the second paragraph with the following:

Referring to Fig. 2, the sensor head assembly 14 includes a probe head 32 mounted in a bracket 36 on a motorized stage 40. The motorized stage 40 moves the probe head 32 in a vertical direction (arrow z) to adjust vertical position of the probe head 32 with respect to the wafer 28 to within a 0.2 μm accuracy. The mechanical stage 40 is attached to a probe arm 44.

In the Claims

Please cancel claims 1-52 and 58-62, and amend claim 53 as follows.

53. (Amended) A semiconductor wafer fabrication system comprising:

a sealed chamber for processing said semiconductor wafer; and a head assembly comprising:

a modulated light source exposing at least a portion of said semiconductor wafer to light having a wavelength and modulated at a frequency; and

a surface photovoltage sensor detecting a surface photovoltage induced at the surface of said semiconductor wafer in response to said light without contacting said wafer, wherein said photovoltage is used to calculate an electrical property of said semiconductor wafer.

said surface voltage sensor of said head assembly located within said sealed chamber.

Remarks

Applicants have amended the specification to describe the relationship between the present application and its prior related applications. Applicants have also amended all references to "a sensor probe assembly" in the specification to "a sensor head assembly" to obviate an objection to drawings in prior application 08/853,171 based on reference character "14" used to designate both a "sensor probe assembly" and a "sensor head assembly."

Applicants have canceled claims 1-52 and 58-62. Claim 53 has been amended.

No new matter has been added.

The undersigned attorney respectfully requests that the above amendments be entered. Subsequently, prompt and favorable action is earnestly solicited.

Respectfully submitted,

Date: August 17, 2001
Reg. No. 45,349

Joseph P. Sullivan
Attorney for Applicants
Testa, Hurwitz, & Thibeault, LLP
High Street Tower
125 High Street
Boston, Massachusetts 02110

Tel. No. (617) 248-7677
Fax: (617) 248-7100

MARKED UP VERSION OF AMENDMENTS

At page 1, before line 1:

RELATED APPLICATIONS

This application is a divisional application of U.S. Application No. 09/488,647 filed on January 20, 2000, which claims priority to U.S. Application No. 08/853,171 filed on May 8, 1997, now U.S. Patent No. 6,069,017, which is a divisional application of U.S. Application No. 08/396,694, filed March 1, 1995, now U.S. Patent No. 5,661,408.

At page 10, first paragraph:

In brief overview, and referring to Fig. 1, an embodiment of such an apparatus 10 for the real-time, in-line, electrical characterization of a semiconductor during manufacturing using induced surface photovoltage includes a sensor ~~probe~~ head assembly 14, supporting electronics 18, and a wafer conveying device 22. In operation, the wafer conveying device 22, such as a conveyor belt, a robotic arm, a wafer chuck or similar device, moves wafers 28, 28' through the manufacturing process and, in one embodiment, beneath the sensor head assembly 14.

At page 10, second paragraph:

Referring to Fig. 2, the sensor ~~probe~~ head assembly 14 includes a probe head 32 mounted in a bracket 36 on a motorized stage 40. The motorized stage 40 moves the probe head 32 in a vertical direction (arrow z) to adjust vertical position of the probe head 32 with respect to the wafer 28 to within a 0.2 μm accuracy. The mechanical stage 40 is attached to a probe arm 44.

In the claims:

53. (Amended) A semiconductor wafer fabrication system comprising:

a sealed chamber for processing said semiconductor wafer; and a head assembly comprising:

a modulated light source exposing at least a portion of said semiconductor wafer to light ~~of a predetermined~~ having a wavelength and modulated at a ~~predetermined~~ frequency; and

a surface photovoltage sensor detecting a surface photovoltage induced at the surface of said semiconductor wafer in response to said light ~~from said modulated light source~~ without contacting said wafer, wherein said photovoltage is used to calculate an electrical property of said semiconductor wafer.

said surface voltage sensor of said head assembly located within said sealed chamber.

CLEAN COPY OF ALL PENDING CLAIMS

53. A semiconductor wafer fabrication system comprising:

a sealed chamber for processing said semiconductor wafer; and a head assembly comprising:

a modulated light source exposing at least a portion of said semiconductor wafer to light having a wavelength and modulated at a frequency; and

a surface photovoltage sensor detecting a surface photovoltage induced at the surface of said semiconductor wafer in response to said light without contacting said wafer, wherein said photovoltage is used to calculate an electrical property of said semiconductor wafer.

said surface voltage sensor of said head assembly located within said sealed chamber.

54. The semiconductor wafer fabrication system of claim 53 wherein said sealed chamber is a reduced pressure chamber.

55. The semiconductor wafer fabrication system of claim 53 wherein said sealed chamber is a chemically reactive gas chamber.

56. The semiconductor wafer fabrication system of claim 53 wherein said sealed chamber is an inert environment chamber.

57. The semiconductor wafer fabrication system of claim 53 wherein said head assembly is entirely located within said sealed chamber.